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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,606	12/04/2003	Masato Koyama	246244US2SRD	6989
22850	7590	08/24/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			VU, HUNG K	
1940 DUKE STREET				
ALEXANDRIA, VA 22314			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,606

Applicant(s)

KOYAMA ET AL.

Examiner

Hung Vu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 11-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicants' communication filed 06/07/05 has been carefully considered by the examiner. The arguments advanced therein are persuasive with respect to the rejections of record, and those rejections are accordingly withdrawn. In view of a further search, however, a new rejection is set forth further below. This action is not made final.

2. The indicated allowability of claims 8 and 9 is withdrawn in view of the newly discovered reference(s) to Quevedo-Lopez et al. (US 2005/0124109) and Chen et al. (PN 6,872,627). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 7, 8 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Quevedo-Lopez et al. (US 2005/0124109).

Quevedo-Lopez et al. discloses, as shown in Figures 1-3, a method of manufacturing a semiconductor device, comprising:

forming a metal oxide film on a substrate;

applying a heat treatment to the metal oxide film under temperature falling within a ranged of between 700°C and 900°C (see section [0032], note that Quevedo-Lopez discloses systems 300, 320 and 340 may include interchangeable elements, therefore, it is inherent that the heat treatment in system 320 would have the temperature ranged of between 700°C and 900°C);

adding nitrogen to the metal oxide film after the heat treatment by using nitrogen under an excited state so as to obtain a gate insulating film consisting of a metal oxynitride film containing a metal-oxygen-nitrogen bond chain (see section [0019] to [0032]). Note that Hwang et al. discloses the same method of forming the gate insulating film, therefore, it is inherent that the metal-oxygen-nitrogen having the bond chain;

forming a gate electrode on the gate insulating film [note that Quevedo-Lopez et al. discloses the method of forming the MOS device and the gate dielectric, it is inherent that a gate electrode will be formed after forming the gate dielectric].

Regarding claim 8, Quevedo-Lopez et al. discloses the method further comprising applying a heat treatment to the gate insulating film before forming the gate electrode. Note that at section [0032], Quevedo-Lopez et al. discloses that systems 300, 320 and 340 may include interchangeable elements, therefore, it is inherent that an oxygen partial pressure of 1×10^{-3} Torr or less is used.

Regarding claim 10, Quevedo-Lopez et al. discloses the metal contained in the gate insulating film includes at least one element selected from the group consisting of Zr, Hf, Ti and a lanthanoide metal.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Quevedo-Lopez et al. (US 2005/0124109) in view of Chen et al. (PN 6,872,627).

Quevedo-Lopez et al. discloses the claimed invention including the method of manufacturing a semiconductor device as explained in the rejection above. Quevedo-Lopez et al. does not disclose the step of forming the gate electrode is continuously carried out under vacuum after deposition of the gate insulating film without exposing the gate electrode to the air atmosphere. However, Chen et al. discloses a method of manufacturing a semiconductor device including a step of forming a gate electrode is continuously carried out under vacuum after deposition of a gate insulating film without exposing the gate electrode to the air atmosphere. Note Col. 8, lines 42-46 and Figure 12 of Chen et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the gate electrode of Quevedo-Lopez et al. continuously carried out under vacuum after deposition of a gate insulating film without exposing the gate electrode to the air atmosphere, such as taught by Chen et al. in order to prevent the formation of a nature oxide on the gate insulating layer.

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Conclusion

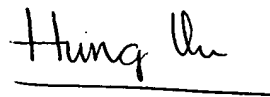
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Tuesday-Friday 6:00-4:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's acting supervisor, Steven Loke can be reached on (571) 272-1657. The Central Fax Number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

August 19, 2005

A handwritten signature in cursive script, appearing to read "Hung Vu", is written over a horizontal line.

Hung Vu

Primary Examiner